Log Event A

Borehole # 10-03-02

Borehole Information

Farm : A	**Tank :** A-103	**Site Number :** 299-E25-79
N-Coord : 41,234	**W-Coord :** 47,553	**TOC Elevation :** 687.30
Water Level, ft :	**Date Drilled :** 4/30/1962	

Casing Record

Type : Steel-welded	Thickness, in. : 0.280	ID, in. : 6
Top Depth, ft. : 0	Bottom Depth, ft. : 125	

Borehole Notes:

Borehole 10-03-02 was originally drilled in April 1962 to a depth of 75 ft with 6-in. casing. In April 1978, an 8-in. casing was drilled over the existing 6-in. casing to a depth of 16 ft and the 6-in. casing was drilled to a depth of 130 ft. The bottom of the 6-in. casing was grouted with 9 gal of cement grout, the annular space around the 6-in. casing was grouted with 45 gal of cement grout, and the 8-in. casing was backpulled.

The 6-in. casing thickness is presumed to be 0.280 in., on the basis of the published thickness for schedule-40, 6-in. steel tubing. The driller's log does not indicate that the casing was perforated. The top of the casing, which is the zero reference for the SGLS, is even with the ground surface.

Equipment Information

Logging System : 2	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 10/1996	**Calibration Reference :** GJO-HAN-13	**Logging Procedure :** P-GJPO-1783

Logging Information

Log Run Number :	1	**Log Run Date :**	10/10/1996	**Logging Engineer:**	Bob Spatz
Start Depth, ft.:	0.0	**Counting Time, sec.:**	100	**L/R :** L **Shield :**	N
Finish Depth, ft. :	20.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Log Run Number :	2	**Log Run Date :**	10/11/1996	**Logging Engineer:**	Bob Spatz
Start Depth, ft.:	129.5	**Counting Time, sec.:**	100	**L/R :** L **Shield :**	N
Finish Depth, ft. :	50.0	**MSA Interval, ft. :**		**Log Speed, ft/min.:**	n/a

Log Run Number :	3	**Log Run Date :**	10/14/1996	**Logging Engineer:**	Bob Spatz
Start Depth, ft.:	51.0	**Counting Time, sec.:**	100	**L/R :** L **Shield :**	N
Finish Depth, ft. :	19.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

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Log Run Number :	4	**Log Run Date :**	10/14/1996	**Logging Engineer:**	Bob Spatz
Start Depth, ft.:	25.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	9.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Logging Operation Notes:

This borehole was logged in three log runs. A fourth log run was conducted as a rerun of a previously logged interval of the borehole as an additional quality check. The total logging depth achieved by the SGLS was 129.5 ft.

Analysis Information

Analyst : D.L. Parker

Data Processing Reference : MAC-VZCP 1.7.9 Analysis Date : 03/04/1998

Analysis Notes :

The pre- and post-survey field verification spectra for all logging runs met the acceptance criteria established for peak shape and system efficiency. The energy calibration and peak-shape calibration from these spectra were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging operation.

A casing correction factor for 0.280-in.-thick casing was applied to the log data during the analysis process.

Shape factor analysis was applied to the SGLS data and provided insights into the distribution of Cs-137 contamination and into the nature of zones of elevated total count gamma-ray activity not attributable to gamma-emitting radionuclides.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

A plot of the shape factor analysis results is included. The plot is used as an interpretive tool to help determine the radial distribution of man-made contaminants around the borehole.

A time-sequence plot of the historical gross gamma log data from 1975 to 1992 is presented with the SGLS log plots.

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In addition, a rerun log showing the concentrations of man-made and naturally occuring radionuclides from two separate log runs is included. The rerun log covers the depth interval from 8 to 26 ft.

Results/Interpretations:

The only man-made radionuclide detected in this borehole was Cs-137. Cs-137 contamination was detected continuously from the ground surface to 18 ft, almost continuously from 20 to 28 ft, and intermittently from 40.5 to 116.5 ft.

The plot of naturally occurring radionuclides shows K-40 concentrations are decreased from about 3.5 to 15 ft. K-40 background concentrations increase sharply at 15.5 ft to a background concentration of about 13 pCi/g. Concentrations remain at about this value to a depth of about 51 ft, where the background K-40 concentration drops to about 10 pCi/g. KUT concentrations increase significantly at a depth of about 122 ft.

An analysis of the shape factors associated with applicable segments of the spectra was performed. The shape factors provide insights into the distribution of the Cs-137 contamination and into the nature of zones of elevated total count gamma-ray activity not attributable to gamma-emitting radionuclides.

As an additional quality assurance check, the interval from 8 to 26 ft was relogged to allow concentration values from two separate log runs to be compared for repeatability.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank A-103.